

# THE ATOM

los alamos  
scientific laboratory  
OF THE UNIVERSITY OF CALIFORNIA  
LOS ALAMOS, NEW MEXICO

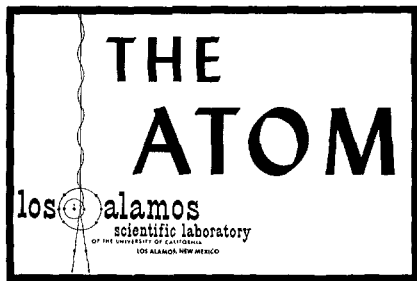
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**ON THE COVER:** LASL's Administration Building  
at night, photographed by Bill Regan.  
Here, like many other places in Los Alamos,  
the work of the Laboratory goes on  
around the clock. See "The Night People,"  
beginning on page 11.

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# KIWI VIBRATION PROBLEM APPARENTLY LICKED



Nevada Senator Howard W. Cannon (center), was at NRDS on February 13 to observe the Kiwi B-4D cold flow test. Following the test he toured the R-MAD (Reactor-Maintenance, Assembly, and Disassembly) building with Frank P. Durham (left) and Keith Boyer. Durham is Alternate N Division Leader at LASL, and Boyer is Associate J Division Leader in charge of testing Kiwi reactors at NRDS. The three men dressed in white and wore gloves and booties in the almost surgically clean bay where reactors are assembled.

LASL scientists and engineers are jubilant over the apparent success of an elaborately-instrumented "cold flow" test on their re-designed Kiwi B4-D reactor core at Jackass Flats on February 13.

While the detailed results will not be known until the reactor is taken apart and all the data has been analyzed, preliminary findings indicated that the troublesome vibration problem has been eliminated, at least under cold flow conditions.

(Cold flow experiments are run with a reactor identical in design to that used in "hot" tests except that it contains no fissionable material, hence there is no nuclear reaction.)

Several hundred channels of instrumentation inserted into and surrounding the core—possible only in a cold flow test—showed that the redesigned core support structure and hot-end seal may have stopped the excessive vibration that caused cracking of fuel elements and other damage in the previous Kiwi B4-A tests. The February 13 tests were run with gaseous nitrogen and hydrogen and with liquid hydrogen in a variety of start-up conditions, all without untoward incident.

The Kiwi B4-D design has been selected as the design to be used in the next series of "hot" tests to be run at NRDS. This work is a continuation of the Rover program, the development of a nuclear rocket propulsion system under the direction of the joint AEC-NASA Space Nuclear Propulsion Office. LASL's role in the program is the development and field testing of nuclear reactors.

# Short Subjects

**"Ten Seconds That Shook the World,"** a film story of the development of the atomic bomb, will be shown to the public, free of charge, on Friday, March 20, 7 and 8:30 p.m., in Los Alamos' Civic Auditorium. The 55-minute black and white movie was commercially-produced for television and has been aired in many parts of the nation. LASL provided some of the footage for the film which depicts the history of the weapon from its inception to its use at Hiroshima. The movie will also be shown at a colloquium for LASL employees at 8:10 a.m., March 17, in the Administration Building auditorium.

**Director N. E. Bradbury** and several LASL staff members were among the delegates from nearly 200 academic institutions in the United States and several foreign countries who attended the University of New Mexico's 75th anniversary opening ceremonies at Albuquerque last month. Bradbury marched in the formal academic procession, wearing his doctoral robes and representing the American Physical Society, the National Academy of Sciences and Pomona College. Others from LASL included Charles Critchfield representing George Washington University, Bob Watt of Rice University and Conrad Longmire representing the American Academy of Arts and Sciences.

**The Nuclear Rocket Development Station** at Jackass Flats, Nevada, was host to 760 high school students and teachers, February 8. The occasion was the observance of National Science Youth Day, commemorating the 117th birthday of Thomas Alva Edison. The program included tours of the MAD building, housing the Kiwi and NERVA experimental reactors, and visits to test cells A and C, the NERVA engine test stand and the test cell control point.

**Brigadier General Delmar L. Crowson**, U.S. Air Force, has been appointed Director of the AEC's Division of Military Application. His promotion was effective February 17. Gen. Crowson, deputy director of the DMA since June 18, 1962, succeeds Major General Austin W. Betts, who served as director since January 15, 1961. Gen. Betts is a former associate director of LASL.

**LASL was a major exhibitor** in the Southwestern Science Exposition that was held in El Paso, Tex., February 19-23. Some 2300 high school science students from the Southwest and Old Mexico attended a series of space science seminars held in conjunction with the public show, which drew more than 50,000 viewers. The LASL exhibit, done in conjunction with ACF Industries and the Space Nuclear Propulsion Office, illustrated Project Rover, the nuclear-powered rocket program.

**P-14 Group Leader James A. Phillips** was one of ten U.S. specialists in plasma physics and controlled thermonuclear reactions who made a 15-day visit to Soviet scientific installations last month. Phillips is a LASL staff member engaged in Project Sherwood research. The trip was part of a visit exchange program existing between the U.S. and the Soviet Union concerning peaceful uses of atomic energy. Phillips left Los Alamos February 7 and was to depart for home on or about February 27.

**Los Alamos Scientific Laboratory** is among the sponsors of the American Instrument Society's second national biomedical instrumentation symposium to be held May 4 through 7 in Albuquerque. Dr. W. Randolph Lovelace II will be the banquet speaker and Dr. Tom Popejoy the luncheon speaker.



# HOME OF THE DESERT FISH

There can be no more potent a magic than the combination of a spring and a tree on the desert's dusty face. It is indeed a blind traveler or one in a terrible hurry who can pass by such a refreshing sight without pausing at least for a look.

The spring at Cane Spring just off one of the main access roads in

the Nevada Test Site is not much more than a seep, a pond choked with edible cattails, and the tree is a scrawny red willow. Anywhere but in the desert, they would not rate a second glance.

But where they are, miles from any tree or any bush bigger than a Joshua, and as many miles from any open or running water, Cane

Spring, its tree, its tiny pool and its tiny fish obviously have been attracting visitors and even settlers for centuries. The fish themselves are a mystery—and may have been planted there as somebody's idea of a practical joke. At least, they keep down the mosquitos. They appear to be a species of bass, but an ichthyologist might find otherwise. Only about an inch long, they swarm under the cattails in myriads.

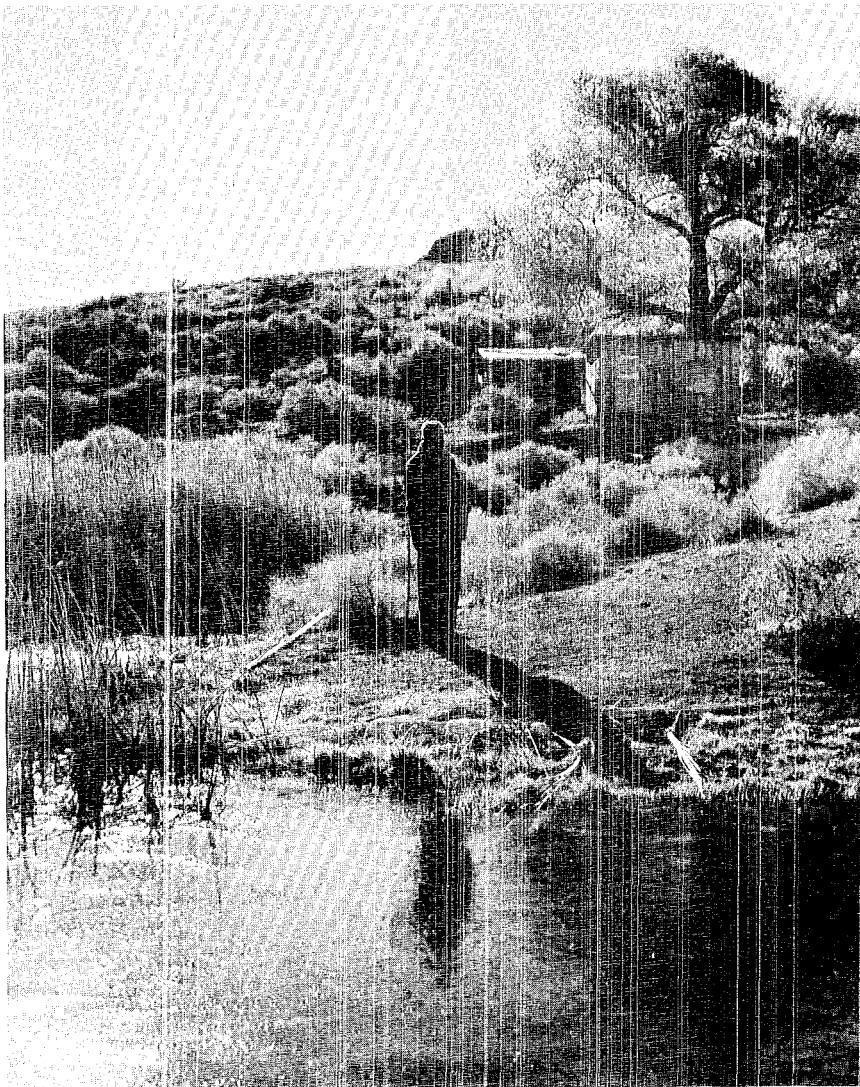
There is a rude shack of fairly recent origin on the site of a tumbledown adobe of indeterminate age. A prospector named Pete Black, about whom nothing else is known, is buried there under a metal marker that says simply, "Pete Black, died April 21, 1922."

A stone carved with the name, "R. J. Byor, 1847," was found near there and is now in the University of Nevada's museum in Reno. There are also legends—that a stage line once stopped here, and that the Mormon Battalion en route from Salt Lake City to California to fight in the Mexican War of 1848 also tarried here a while, but the evidence is paltry.

The archeological record is clear, as far back as it goes—grave sites and artifacts speak of generations of camping Paiutes, and earlier, of the people known as Pueblo II who left their traces there dating from around 1400 A.D.

The pieces of pottery littered all over the place include the tell-tale brownware of the Paiutes, and Pueblo II black-on-white sherds, mixed in with chips of obsidian, chalcedony and chert left over from making arrowheads, spear points and implements.

LASL archeologist Fred Worman feels certain that a systematic study of the area, including some digging, would reveal evidence of much earlier occupancy.



Cane Spring, on the Nevada Test Site, has attracted campers and settlers for countless centuries. Its lone willow tree shades a miner's shack; a metal marker commemorates the burial place of one Pete Smith, who died there in 1922.



In the Project Sherwood building, Danny Chang, a senior at Los Angeles High School, discusses LASL's plasma gun with its inventor, John Marshall.

## A BIG DAY

For a boy with a keen interest in science, an expense-paid trip from Los Angeles, California, to visit Los Alamos Scientific Laboratory was a rare opportunity.

Danny Chang, a 16-year-old senior at Los Angeles High School, was one of 611 high school students and their teachers who were guests of the Laboratory last month for its eighth annual observance of National Science Youth Day.

Danny and four of his classmates in John Essick's senior physics course won trips to the Atomic City by scoring high on a written test about the Laboratory and its research.

With Essick, Danny and the other winning students—Gary Bachlund, David Erlich, Mikio Mukae and Arthur Takayama—flew to Albuquerque the afternoon before their February 14 tour and rented a car for the remaining 90 miles. The next day they toured LASL's Physics

Danny and his classmates had front row seats in the Administration Building auditorium to hear welcoming remarks by LASL Director Norris Bradbury.



# FOR DANNY

Building, Health Research Laboratory and Project Sherwood facility. With notebooks full and with much to talk about they flew home that night.

Making the trip possible was a grant given to their school several years ago to send top senior physics students on field trips. It covers all expenses except food and lodging. This was the third straight year that Essick has brought members of his class to Los Alamos.

Honors having their obligations, Danny and his classmates have been asked to report on their trip at a Los Angeles junior high school, to their physics class, and at a meeting of the PTA.



In the Health Research Laboratory, Danny takes a break from his diligent note-taking to pet a laboratory monkey, held by Glenda Oakley.

A special exhibit gets Danny's attention in Physics Building's standards lab.



Before leaving for home, Danny takes a souvenir picture of his classmates and teacher in front of The Lodge.

# COUNTING NEW MEXICO'S WILDLIFE

OR

## HOW MANY OF WHAT, WHERE AND WHEN?

By DAVID G. JACKSON

Editor, *New Mexico Wildlife*

This is not the season when Los Alamos people think of hunting, but the animals that will be hunted in New Mexico next fall are taking up a great deal of time in the thoughts of officers of the New Mexico Department of Game and Fish. During the winter and spring the biologists, district conservation officers, farm managers, trappers and all other field men are engaged in conducting a game census which will be the basis of recommendations for the hunting seasons next fall.

Modern game management has many facets, just as there are to all sciences. But the starting point in nearly all management procedures is a knowledge of the numbers of animals—mammals or birds—that are in an area to begin with.

There are as many game census techniques as there are species of game to be counted. Strangely enough, an actual count is seldom made. For most species the census is conducted on the basis of the population trend of the animal, that is, whether there are more, less or the same number of the species as there were the last time they were checked. This census, taken year after year, and correlated with

the habitat conditions, changes in the climate, hunting pressure, general condition of the animals or birds in question, the sex ratio of the specie, gives the information necessary to determine what the hunting season dates and bag limits should be.

There are two main methods of counting animals, direct and indirect. In the direct method, individual animals are actually counted and their numbers recorded. In the indirect method, the sign the animal leaves is counted and the number is estimated by the amount of sign. Wild animals are much more difficult to count than domestic stock. A rancher or farmer at least knows how many animals he has to start with and can confine them to a certain area. Game animals move around and, except in rare instances, an original count is impossible to get.

The most accurate direct counting method is the aerial survey used to determine the numbers of elk, antelope and migratory waterfowl in the state. A skilled pilot and experienced observer fly over and actually count the animals of certain species. This method has proven nearly 80 percent accurate for an-

telope which are easy to see and have little or no cover to hide under. The count accuracy is not as high for elk and waterfowl, but is good enough to determine the population trend. But aerial surveys are hazardous because of the extreme flying conditions often encountered.

During certain seasons of the year, some animals gather in a small area which usually makes counting from the ground much easier. During the spring and fall prairie chickens gather at "booming grounds" and the cocks do their fascinating and beautiful mating dance. The location of the booming grounds are the same from year to year, so Game Department officers







go to the grounds at dawn and dusk and count the birds. The only problem is that there are more male birds than females in evidence, so the number of females must be estimated.

The situation is reversed for deer and elk. Females and young travel together and are easily spotted, but the males are usually off by themselves or in small groups in rougher country. One method used to count elk bulls during the rutting or breeding season is the bugling survey. During the rut, the bull elk makes a high pitched whistling sound which other bulls answer. Men, imitating the sound, can count the number of answers they receive. These counts, taken in the

Officers of the New Mexico Department of Game and Fish fly low over Storrie Lake to count waterfowl.

same areas year after year, help to establish the trend of the herd.

Coo counts and trend routes are other direct methods used to count birds and animals. With the coo count, a Department officer drives a specified route stopping at intervals and counts the number of mourning doves he hears calling or cooing. By comparing the coo counts over the years a determination can be made of the population trend. Trend routes are used to determine the population trend of quail. Officers drive certain routes and count the number of coveys of

young and the number of young per covey that they see. The routes driven are the same each year.

The success of the direct methods of game census depends to a large extent on the skill of the observer. The observer must have a sharp sense of hearing and sight and be able to evaluate conditions under which observations are made.

Indirect methods of taking a game census are very valuable techniques where actual counts are either difficult or impossible. The most important method of deter-

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## WILDLIFE . . .

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mining the population trend of New Mexico's deer herds is the establishment of pellet group transects. These transects are small plots located in the state's deer ranges. Periodically the number of deer droppings are counted on each plot and painted with a special paint to prevent duplication of the count. Using predetermined formulas, Department game managers can determine whether the herd in the area is increasing, decreasing or staying about the same.

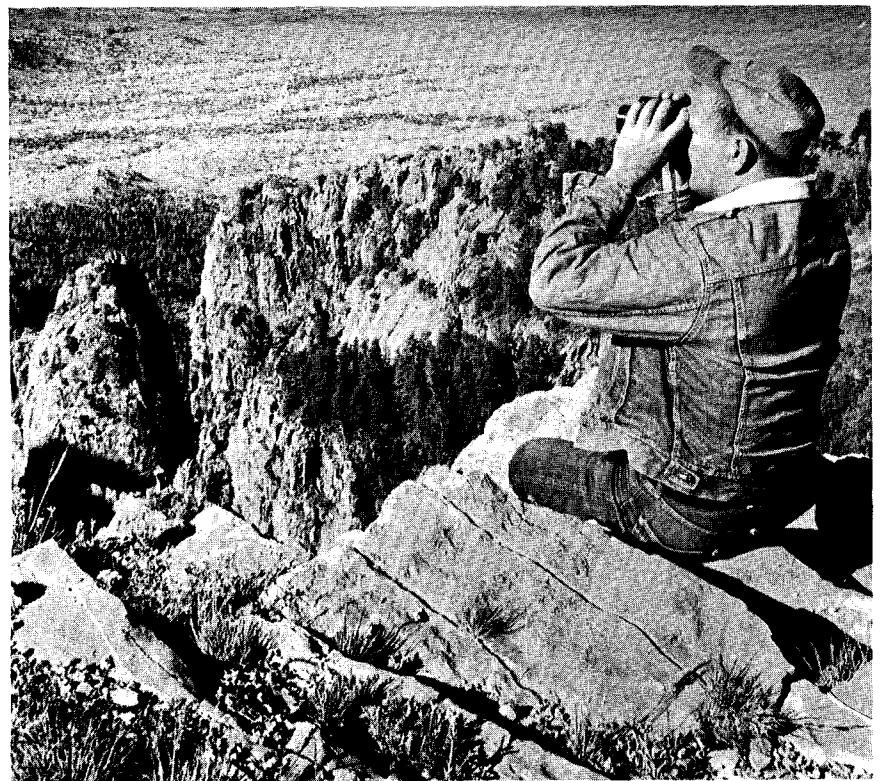
This information, together with reports on the browse conditions, the hunter success figures for the area, the general condition of animals checked during the hunt and sex and age ratios of animals taken help to give the information necessary to properly manage the herd.

Hunter success is determined by a direct method, the random card survey. A statistically significant number of hunters are sent questionnaires which ask such things as the type of license purchased, game species hunted, hunter success, age and sex of species taken, time spent hunting and area hunted. Although these questions are asked of only a small percentage of the hunters, the information received is very accurate. The survey accuracy is periodically checked by contacting all the hunters that were in a given area or on a certain hunt.

When the information is complete, it is tabulated, correlated, and compared with all the other information necessary to manage the species and presented to the State Game Commission as the basis of the Department's recommendations for the particular season in question. The Commission sets the season and the hunter can once again prepare to go to the field confident that he will have a chance at his fair share of the game.



Frightened by the low-flying survey plane from which this photograph was taken, a herd of antelope dash off across the New Mexico landscape.



An officer looks for Rocky Mountain bighorn sheep high in the Sandia Mountains.



## LAMPRE Retires

LAMPRE, the world's first molten plutonium nuclear reactor, is in semi-retirement.

After operating for about three years, work with the Los Alamos Molten Plutonium Reactor Experiment was suspended last month. David B. Hall, the Laboratory's K (Power Reactor) Division leader and chairman of the AEC's Advisory Committee on Reactor Safeguards, said scientists have learned about all they can from the reactor, but that LAMPRE will be placed on a stand-by condition in the event future experimentation is warranted.

LAMPRE helped LASL evaluate the use of metallic plutonium fuel in the liquid rather than the solid state, and was part of the Laboratory's program to develop and test fast breeder concepts (a fast breeder reactor can produce power and at the same time manufacture more new fissionable material than it consumes).

LAMPRE, which has been operated since early 1961 with two different core loadings, demonstrated highly satisfactory properties of control and stability. However, extrapolation to higher power designs requires testing under conditions not obtainable in LAMPRE.

Hall said the suspension of LAMPRE releases manpower for the more important job of accelerating the design for more advanced molten plutonium reactor concepts of the Fast Reactor Core Test Facility (FRCTF) at the Laboratory. Construction of the \$8 million FRCTF building will be completed about July, 1965. The first core, which may cost an additional \$750,000 to \$1,000,000, will be completed

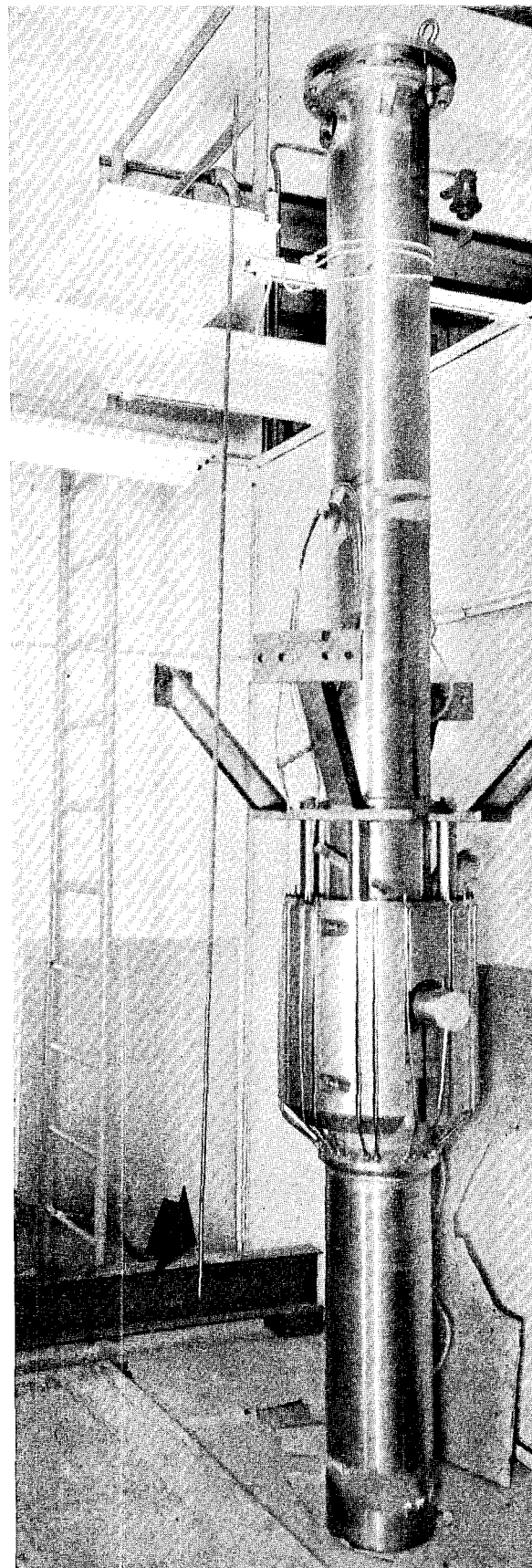
about January 1967 and will be ready for operation by mid-1967. Reactor equipment cannot be installed until the building is completed and the contractor has moved out.

Chemical and metallurgical research and development of the FRCTF reactor core will take a number of years. The reactor fuel will be a cobalt-cerium-plutonium ternary alloy, and LASL scientists must determine the properties of the fuel, containment of the alloy at high temperatures, and furnace environment.

The fuel region of LAMPRE is about six inches high and six inches in diameter. Small capsules of tantalum metal are used to contain the fuel in the core, and heat is removed from the fissioning fuel by a circulating stream of molten sodium. Operating temperature of the reactor is about 950 degrees Fahrenheit.

LASL is the only laboratory that has been experimenting with molten plutonium fuels.

The LAMPRE reactor, shown here just before being lowered into the reactor pit, is a remarkably compact device. The diameter of the vessel is only eight inches. The tantalum fuel capsules (see arrow lower left) are eight inches long.



# CARTOON TIME IN THE LABORATORY



NOTHING MAKES  
CHILDREN SIT STILL  
QUITE SO WELL  
AS A TV SET

When Los Alamos radiobiologists planned an experiment concerning retention of iodine in the bodies of children they faced a major problem: How to get the subjects to sit still for 15 minutes, the time needed for a detector to "count" a radioactive tracer in the thyroid gland, where iodine concentrates.

Harmless doses of radioiodine—about 10 nanocuries (10 billionths of a curie)—could be used. But to count such a minute amount of radioactivity meant quarter-hour surveillance by even the extremely sensitive sodium iodide crystal detector, aimed precisely at the thyroid's location in the neck.

The photo shows the solution: A small television set mounted in such a way that good viewing required the head to be kept in the position desired for the count.

Health Division's Marvin Van Dilla and Mack Fulwyler (both of H-4) conducted the three-month experiment with eight youngsters, ages 4 to 9. Tests were run in the afternoon, timed to coincide with "Cartoon Time" on television.

The TV pacifier proved "very successful," they reported, "although occasionally it was difficult to remove the child during a particularly fascinating cartoon."

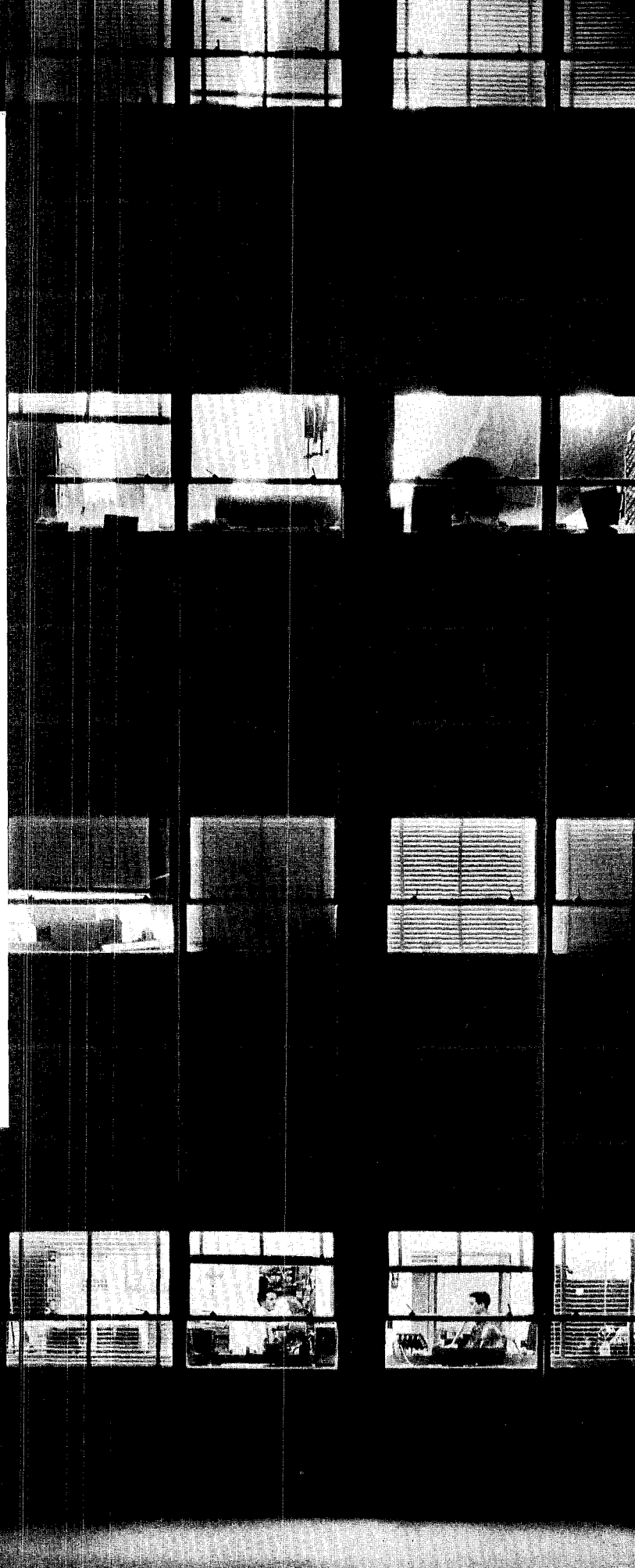
# THE NIGHT PEOPLE

For a considerable number of LASL, Zia and AEC employees, the 5 o'clock rush is only something to hear about.

These are the "night people," the folks who eat breakfast in the afternoon and generally lead an upside-down existence.

Be they custodians or guards, machinists or computer operators, message clerks or drivers, the night people come to work when others go home. They perform their various duties usually unseen and unknown, but are no less a part of the continuing pulse of the Laboratory.

Some of these night people are shown on the following pages.

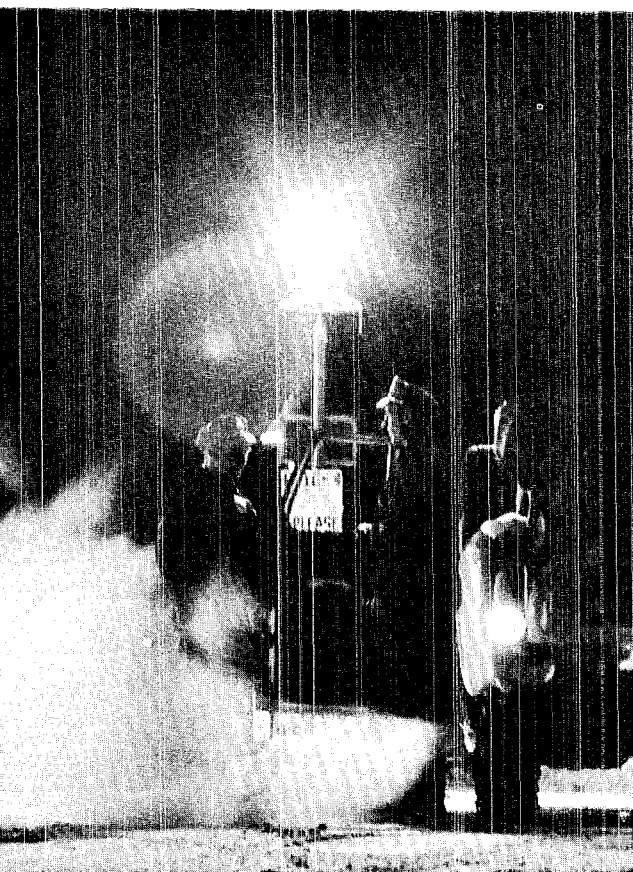




Frances Dunn (left) and Theresa Winslow, T-1 electronic data processing operators, help keep LASL's super com-

puter, Stretch, operating throughout the night. Nearly all of T Division's computers are operated on a 24-hour basis.

An AEC Protective Force sergeant spot checks a guard at an outlying Laboratory site.



At the start of their shift, Zia Company janitors are given their assignments for the night. The scene is the basement of the Administration Building.



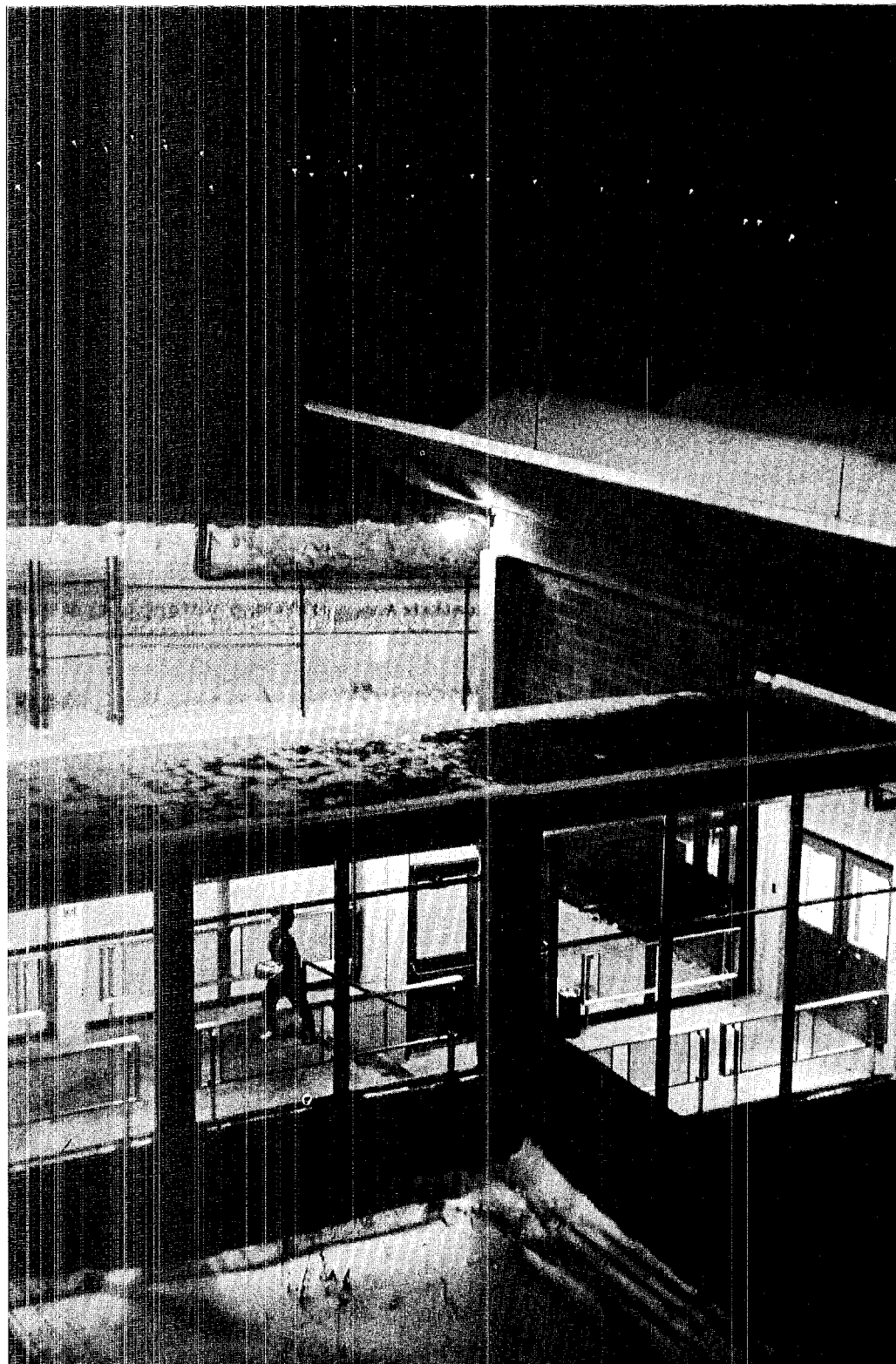




## NIGHT PEOPLE . . .

Photographs by Bill Jack Rodgers and Bill Regan

One of the Laboratory's "night people" walks through the brightly lit walkway which connects Stretch computer facility with the Administration building.



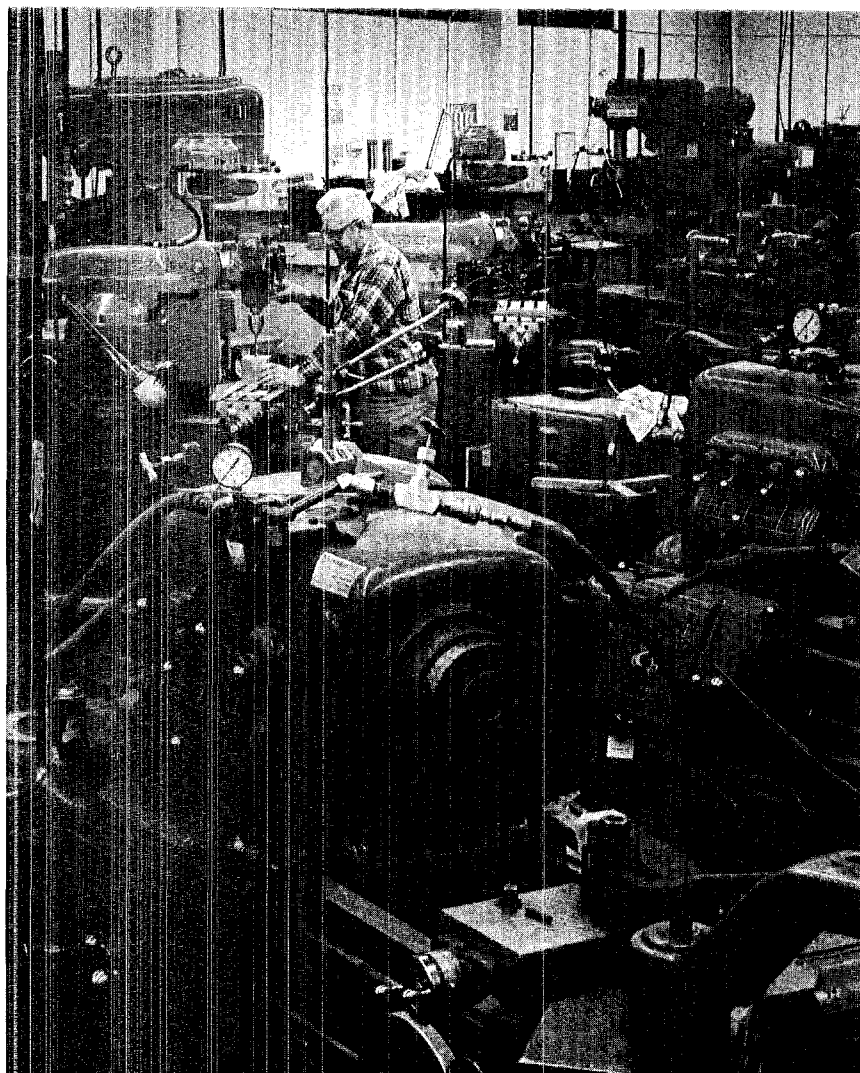


A busy place in the daytime, the Los Alamos airport can be lonely at night.

## NIGHT PEOPLE . . .

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At S Site, late at night, an SD machinist operates a drill press.





# FROM THE SURFACE LINES OF YOUR VISAGE I HAD A CONCEPT YOU WERE CONCERNED

BY EARL ZIMMERMAN

One of the unheralded developments of this age of atoms and orbits has been the appearance of a scientific language, a jargon of words and phrases that occasionally is unintelligible to the layman.

Facility with this ultra-language is not learned, like German or Latin are learned, but is acquired more through osmosis from time spent in lecture hall, laboratory and in writing reports. The words and phrases no doubt are well-founded, perhaps on the demand for exquisite accuracy when discussing scientific subjects. But, quite often, they creep into everyday conversation.

For a man of science there are better words than such mundane and vague terms as maybe, about, idea, half as much, reasons for, twice as much, able, or a million.

Consider this conversation overheard while waiting in line at a Laboratory cafeteria:

"Hello, Joe.

Hi, Jack. How are things?

Size-wise, my problems are minimal.

That's encouraging. From the characteristics of the surface lines of your visage, I had a concept you were concerned.

Your interpretation is essentially within the parameters of my area of interest, but I suspect your assessment and extrapolation of my external appearance was in error by several orders of magnitude.

Then the prime factorization for your frown isn't of serious consequence?

This is true, Joe. However, if indeed you possess the capability to assist in the determination and finalizing of my investigation, it would be an improvement by a factor of two.

Tell me more, Jack.

Well, at some point in time I will phase to the service counter. Of the order of five varieties of pie are available there. My lucubration

concerns the criteria for consideration. Hopefully, I will select a quote unquote tasty one.

Jack, I would be happy to collaborate with you in making the choice.

Thank you, Joe, you are a rare friend—one in ten to the sixth.\*\*

\* \* \*

\* Translation:

"Hello, Joe.

Hi Jack. How are things?

## WHAT'S DOING

LOS ALAMOS SINFONIETTA: Concert, Cumbres school auditorium. Tickets, available at the door \$1.50 adults, 75 cents, students.

Friday, March 20, 8:15 p.m., Patricia Winter Mendius, soprano.

AUGUSTANA CHOIR: 72 voices. Performance sponsored by the High School Choir Parents Assn. and Bethlehem Lutheran Choir. Civic Auditorium. Tickets, \$1.50 adults; 75 cents students, available at the door.

Thursday, April 2, 8:15 p.m.

FILM SOCIETY: Civic Auditorium, films shown 7 and 9 p.m. unless otherwise noted. Admission by \$3 season ticket or 90 cents single admission.

Wednesday, March 18, "Four Days of Naples." Italian drama, 124 minutes.

OUTDOOR ASSOCIATION: No charge open to the public. Contact leader for further information on specific hikes.

Saturday, March 21, Snowshoe hike—Santa Fe Baldy.

Leader, Herb Ungnade

LITTLE THEATER: Civic Auditorium, 8:30 p.m. Friday and Saturday, March 13 and 14, "Great God Brown" by Eugene O'Neill.

LOS ALAMOS HIGH SCHOOL POOL: Winter schedule for public swimming. Adults 35 cents; students 15 cents.

Monday, 7 to 9 p.m. Open

Tuesday, 7 to 9 p.m. Adults

Saturday, 1 to 5 p.m. Open

Sunday, 1 to 5 p.m. Open

INTERNATIONAL FOLK DANCE CLUB: Open to the public. Meets the first Tuesday of each month, 8 p.m., Recreation Hall.

SWIMMING CLUB OF LOS ALAMOS, INC.: Membership open to adults interested in swimming. Club meets every Sunday, 7 to 9 p.m.

Fine.

Good. From the look on your face I had an idea you were upset.

I've got a problem, but it's nothing much.

Not serious?

That's right, Joe. But maybe you can help; after all, two heads are better than one.

Yeah?

Well, I'm just about to the head of the line, and they've got about five different kinds of pie up there. I want to be sure and get a goodie.

Jack, I'll be happy to help you pick a piece.

Thanks, Joe, you're a pal—one in a million."

## HOUSING BOARD NO MORE

The Housing Policy Board, once the focal point for most of the town's perennial housing troubles, died Feb. 14. AEC Area Manager C. C. Campbell gave it a decent burial after it had suffered through several years of decline.

The Board came into existence in 1947 to consolidate the activities of several previous boards, some of them left over from military days. For more than a decade it formulated policy on housing (as recommendations to the AEC manager), suggested rules for family size, divided up housing units into allocations for the various employers, and passed on requests for exception to the assignment rules for medical and other emergencies.

It rarely heard complaints directly from individuals, except in the early days and later in rare instances. Its main function was to settle differences of policy among employers.

As policies became stabilized and more and more decisions were left to the employers as assigning agencies, there was less and less for the board to do.

# CUSTOM OF THE CROSSES

BY JOHN YOUNG

There was a time not so many years ago when a surprise awaited the tourist who ventured up the steep and narrow grade from the tiny hamlet of Chupadero to the equally tiny hamlet of En Medio,

hidden in the foothills five or six miles north of Tesuque village.

At the very summit of one of those roller-coaster hills stood a large double pile of wooden crosses, heaped like jackstraws on either side of the road, mingled with an astonishing number of small boulders.

The crosses and the boulders marked the spot where generations of pallbearers had rested on their weary mile-long journey afoot from Chupadero to the yellow adobe church and adjacent graveyard at En Medio. Always they lifted their burden from their shoulders and put it down at this high point; al-

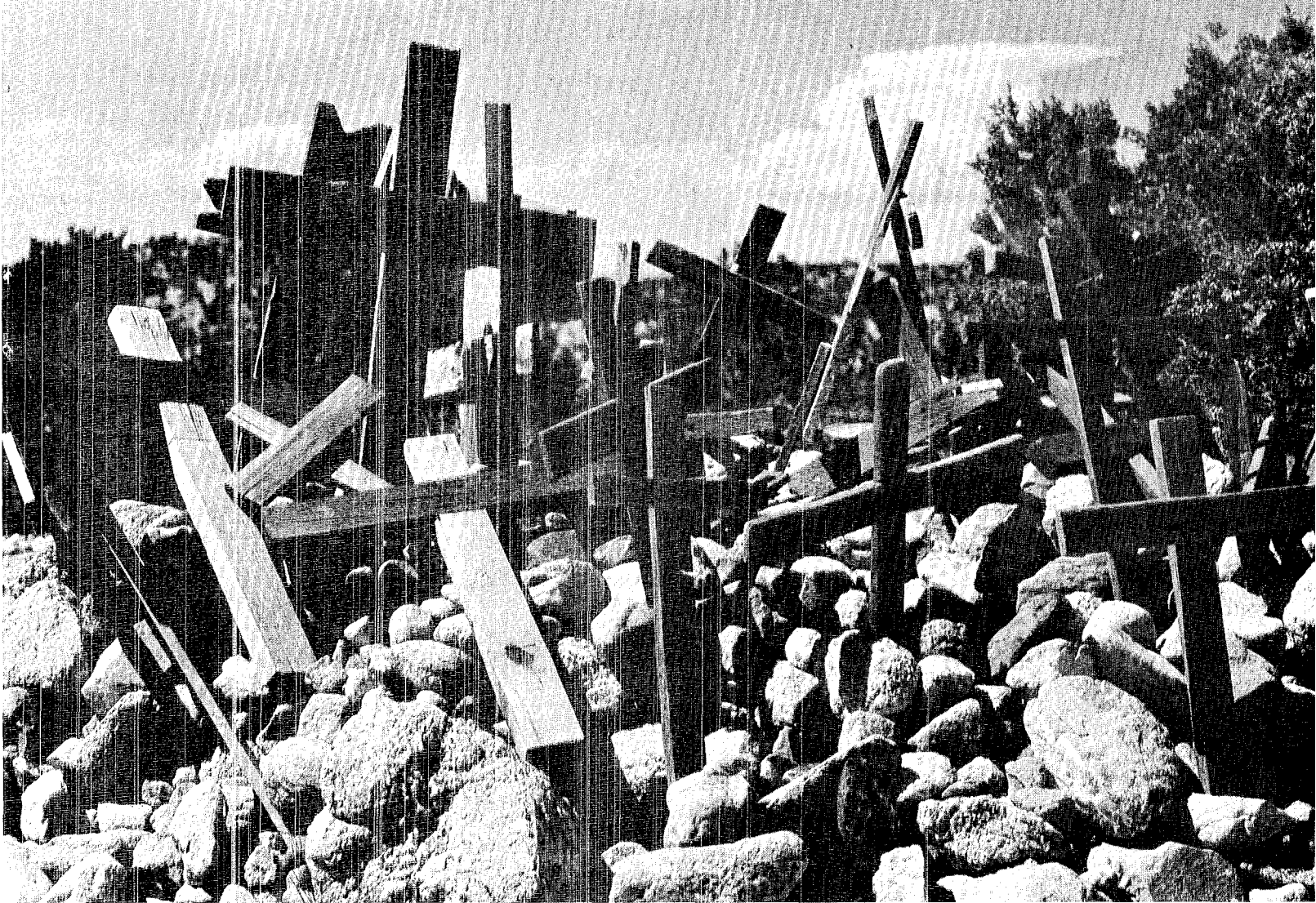
ways they honored the place of rest by adding a wooden cross to the heap, or at least a large stone. This was the custom of the country. Such heaps were common along all the by-ways of northern New Mexico 20 years ago.

Times changed abruptly, here as elsewhere, with World War II. The pickup truck replaced the procession. Tourists invaded the back country and the crosses disappeared, to become authentic local color for some body's patio or den. Road widening projects dispersed what was left.

There is not much left of Chupadero (Spanish for cattle-tick), or of En Medio either, for that matter. (En Medio, at the end of State Route 22, should not be confused with Rio *del* Medio a few miles north. Both mean "in the middle" but nobody now seems to know what either is in the middle of). Chupadero lies on Chupadero Creek and En Medio on Rio En Medio, both headwaters of the Pojoaque River which flows northwest through Nambe Pueblo. Nambe and Tesuque Indian lands occupy most of the region around the villages, except for a few small private holdings dating from Spanish times. There are about as many abandoned adobe houses as there are occupied homes left in the area;

The narrow, steep and crooked road from Chupadero to Rio En Medio, in the hills behind Tesuque, is still steep and crooked but no longer narrow.



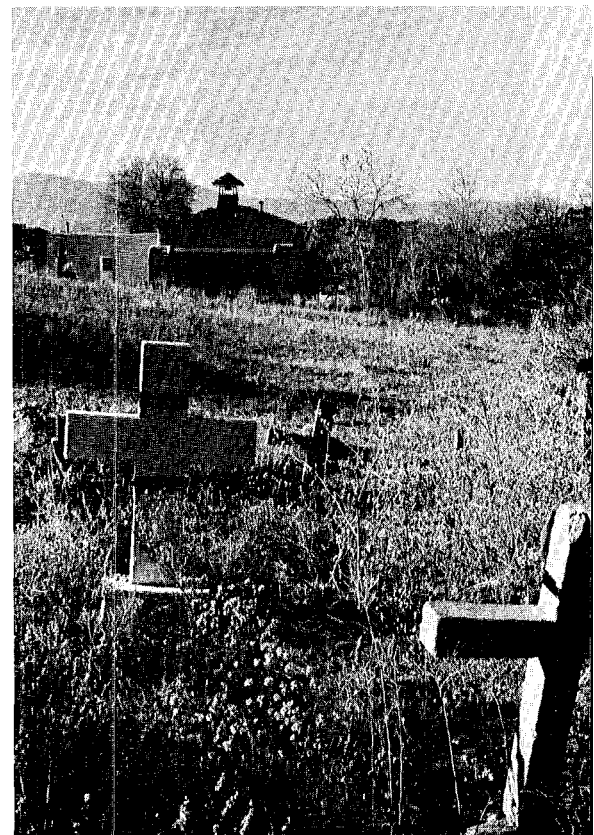


Heaps of stones and crude wooden crosses once dotted the roadsides of northern New Mexico, marking the place where a funeral procession rested the coffin on the way to the graveyard. These relics of a by-gone day are hard to find now. This one all but disappeared when the road from Chupadero to Rio En Medio was widened.

scattered little orchards all gone to weeds; woodcutters' roads to nowhere; serenity and seclusion within rifle shot of a bustling main highway.

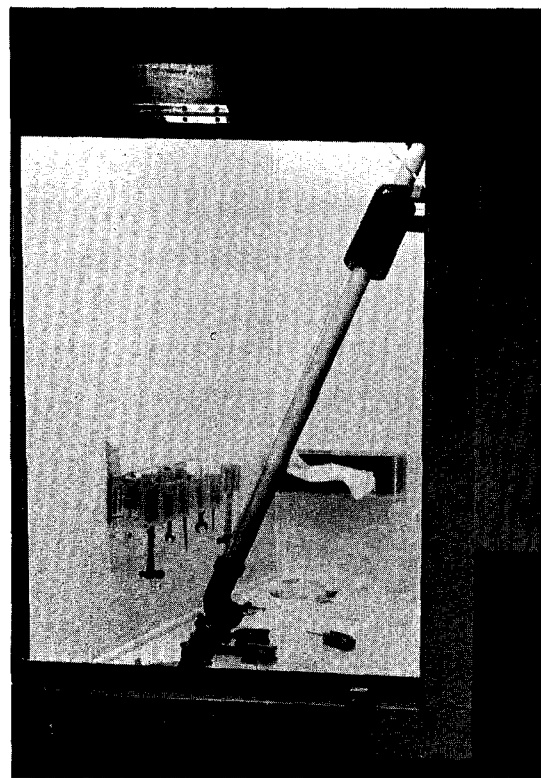
This is a singularly appropriate setting for a modern monastery, the Sangre de Cristo Novitiate established a few years ago just above Chupadero. In sharp contrast is the ultra-modern micro-wave telephone repeater station whose tower and strange antenna dominate the skyline nearby, symbolic of the radical change that has come so recently to this back country.

The quaint yellow adobe church and its adjoining graveyard are the distinguishing feature of the tiny village of Rio En Medio, north of Tesuque.



# THE HIT OF THE HILL

**IN ITS FIRST SIX MONTHS  
THE LABORATORY'S SCIENTIFIC MUSEUM  
HAS BEEN VISITED BY PERSONS  
FROM MOST STATES AND 24 FOREIGN COUNTRIES**



It's only six months old but the LASL scientific museum has already become a major attraction in Los Alamos.

Since it opened last August in Room 136 in AP Building, across the street from The Lodge, the exhibit has had more than 4,000 visitors. They have come from nearly every state and from 24 foreign countries.

What they see ranges from a chair once used by former Laboratory Director J. Robert Oppenheimer, to historical documents and photographs, to working models of modern LASL reactors.

Names of Los Alamos residents and their guests fill a large portion of the guest register but many persons have made special trips to the Hill just to view the exhibit. Large groups, like the Hollywood, California, Lions Club, have come by chartered bus.

Popularity of the showplace has surprised even Bob Porton, who runs the museum in connection

with the Laboratory's Community Relations Office, of which he is director.

At first, Porton planned to have the museum open only during regular Laboratory working hours, Monday through Friday. But within two months, by popular demand, it was placed on a seven-day-week schedule. Local teachers were hired part-time as guides on week-ends. At present, in addition to week-days, the museum is open all day Saturdays and on Sunday afternoons.

Contributing to the success have been articles about the museum in newspapers and magazines across the nation. *Life* magazine last month listed it among the major science exhibits in the United States.

Of considerable significance is the museum's collection of World War II era photographs and documents. They trace the early development of the town and Laboratory from the beginnings of the atomic bomb

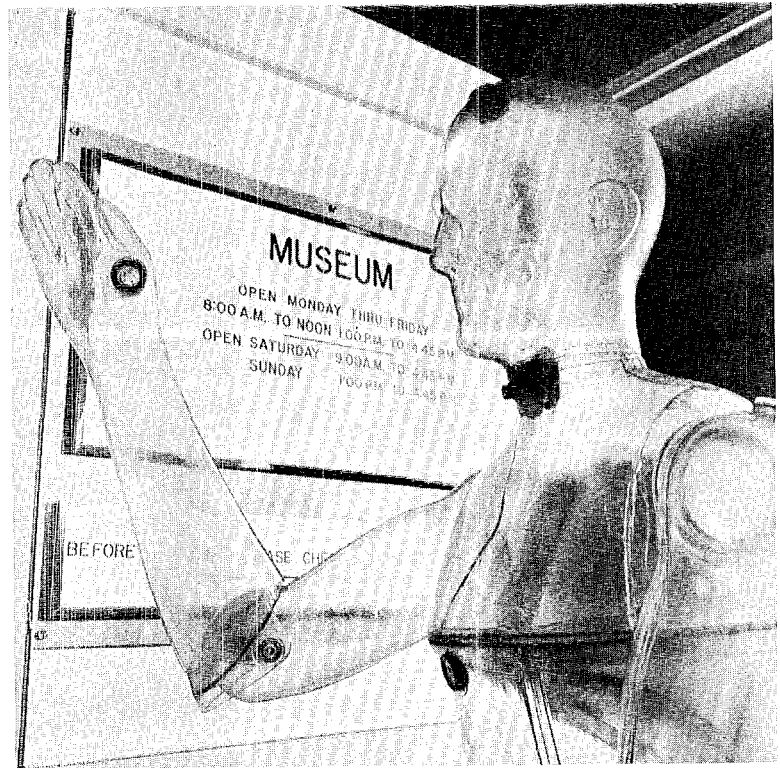
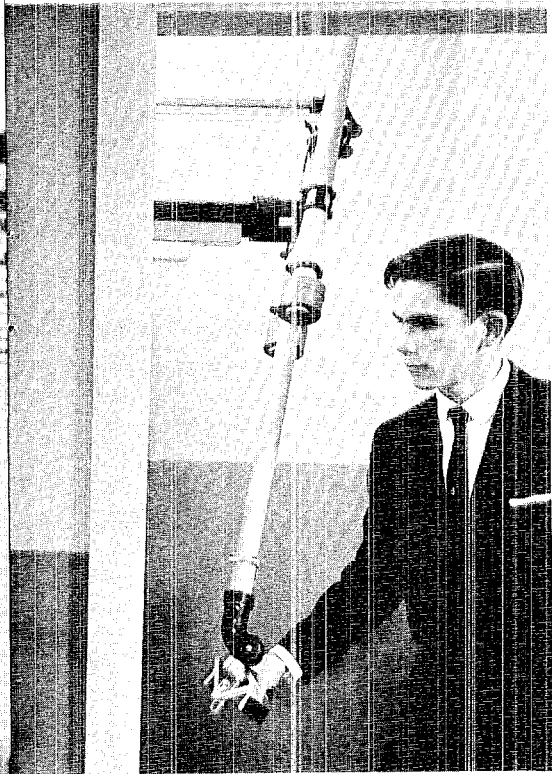
project to Hiroshima, Nagasaki and the successful completion of the war.

The museum is small, as museums go, but its number of displays grows steadily. Among the more recent additions are these: A life-size "plastic man," used for many years in health physics research on radiation's effects on the human body; a display of X-ray photography and other techniques employed by LASL's nondestructive testing group to locate flaws in materials.

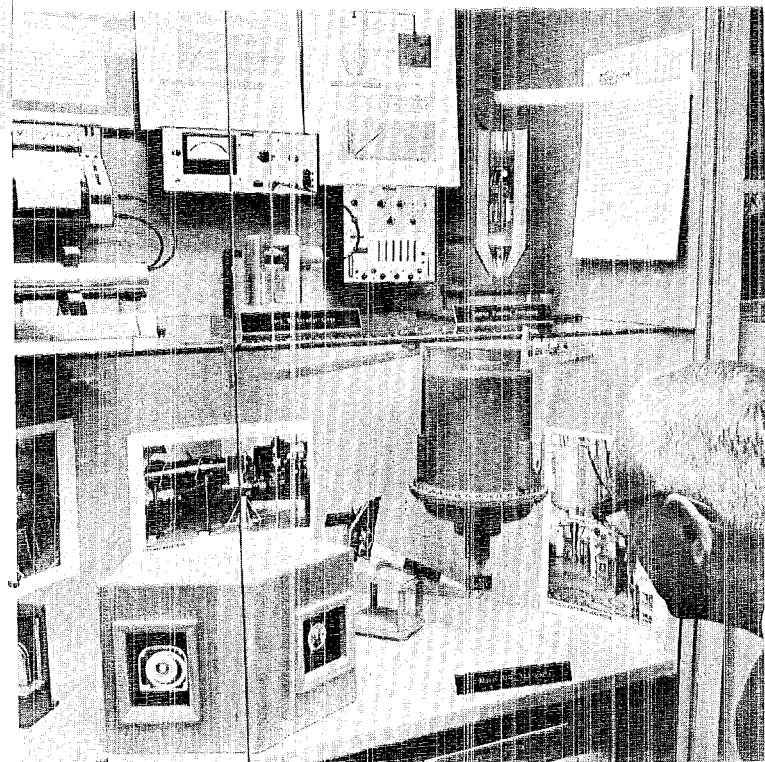
A simulated "hot cell," installed in a corner of the museum a few weeks ago, seems likely to become the most popular attraction of all. It features a real remote-controlled manipulator, or mechanical hand. Visitors may try their skill in handling objects separated from them by a lead-glass window.

Sometime next year, according to plans, the museum will move to new quarters in a building to be constructed near the Administration Building.





IT'S SMALL, AS MUSEUMS GO,  
BUT NEW DISPLAYS ARE GRADUALLY BEING ADDED



Some of the more recent additions to LASL's scientific museum are pictured on these pages. A remote-controlled manipulator of the type used for handling radioactive materials is shown at upper left. Visitors, like the young man in the photograph, may try their skill at picking up objects separated from them by a lead-glass window in the simulated hot cell. Plastic man (above), used in numerous radiation studies in LASL's Health Research Laboratory, now welcomes visitors. To the left is an exhibit which shows some of the techniques and equipment used by the nondestructive testing group.

## THE HONOR ROLL

# 271 CITED FOR LONG SERVICE

The Laboratory's growth and maturity to a 21-year-old were evident in February when 271 employees were cited for 20, 15, and 10 years of service to the University of California. It was the largest number so honored in LASL history. Included were 264 at Los Alamos and seven in the Los Angeles purchasing office (SP-LA). Thirty-five were recognized for 20 years service, 88 for 15 years and 148 for 10 years. Ten-year pins for Los Alamos employees were awarded February 12. The 15- and

20-year awards were given February 19. Both presentations were by Director Norris E. Bradbury during brief ceremonies in the Administration Building Auditorium. Thirty-eight employees who were unable to be present will receive their pins at the next ceremony. Los Angeles employees received their pins from Harry S. Allen, head of the Supply and Property Department, on February 12. Allen was in the first group of LASL employees who received 20-year pins in June, 1963.

### Those cited for 20 years with the Laboratory:

William H. Ashley, CMB-1; Richard D. Baker, CMB-DO; Max Beuchat, SP-LA; Elmer R. Bowen, SD-1; M. Louise Bowen, SD-O; Berlyn Brixner, GMX-9; Clarence J. Brown, P-1; James H. Coon, P-4; Jean M. Davis, P-DO; Frances S. Dubberly, GMX-8; Hugh O. Dubberly, SP-1.

Robert D. Fox, SD-O; Wray B. Garn, GMX-6; Josephine L. Gilligan, J-3; Jano W. Haley, P-15; W. Thurman Hargett, ENG-4; Howard E. Hathaway, CMF-13; Leslie G. Hawkins, DIR OFF; J. Carlton Hoogterp, N-2; Robert I. Howes, SD-2; Stephen G. Kasunic, W-1.

L. D. P. King, DIR OFF; Mildred Moore, SP-LA; George H. Moulton, CMB-3; Giza J. Nagy, SD-5; Paul C. Olivas, P-3; Frank Osvath, SD-1; Josephine E. Powers, T-1; William A. Raies, AO-1; James E. Runyan, N-1; Raemer E. Schreiber, DIR OFF; Charlie C. Stallings, ENG-4; William Van Buskirk, SD-1; Robert J. Van Gemert, SP-DO, and Roger H. White, N-2.

### Fifteen-year Veterans:

Robert W. Atkins, SP-3; David M. Barton, N-2; Gordon L. Brown, SD-2; Armand T. Brousseau, P-15; Wilma M. Bruce, AO-2; John J. Clifford, D-8; Donald B. Court,

CMB-7; George A. Cowan, J-11; Kathleen P. Donovan, P-1; Robert W. Drake, GMX-DO; Marjorie L. Dube, W-DO; Alfred C. Dumrose, CMB-8; Theodore A. Dunn, PER-5.

James J. Dvorak, SP-3; Arthur T. Ekman, SP-LA; Eugene H. Eyster, GMX-DO; Kurt Freygang, SP-LA; Eugenio P. Garcia, GMX-3; Tony H. Garcia, H-1; Alex Gutierrez, Jr., H-1; Dibbon C. Hagar, D-8; Antonio J. Herrera, GMX-3; Felix Herrera, GMX-3; Juanita M. Hidy, N-5; Edward E. Holcomb, ADP-SF; R. Clark Jobs, AO-4; W. Burton Lewis, CMF-2; Praxedes Lopez, GMX-3; Matias Lujan, GMX-3.

Aurelia R. Madrid, GMX-DO; Ben G. Maestas, N-2; Ascension J. Martinez, GMX-3; Henry Martinez, GMX-3; Jesus M. Martinez, SP-4; Jose Z. Martinez, GMX-3; Maria T. Martinez, GMX-7; Silas E. Martinez, GMX-3; Vences J. Martinez, GMX-4; Elizabeth A. Masilun, GMX-4; William J. McCreary, CMB-8; G. O. McIntire, SP-LA; Lucille G. McQuillan, H-1; Roy G. Merryman, N-1.

Rosana J. Minnick, ENG-3; Carpio R. Montoya, SP-4; Eloy J. Montoya, J-10; John R. Mosley, W-7; Pearl I. Neal, J-11; Margaret M. Nelson, SP-8; Petrita Q. Oliver, J-11; Alfredo L. Ortiz, GMX-3; Peter Osvath, CMB-7; Charles

Pacheco, CMB-7; Hugh C. Paxton, N-2; Juanita V. Pena, CMB-1; Peter M. Petersen, SP-1; Rolf E. Peterson, K-1.

John Pilch, D-8; Leslie I. Post, CMB-8; Ludie A. Pulliam, CMB-1; Alfonso R. Quintana, GMX-7; Esequiel Rael, GMX-3; Roy Reider, H-3; Louise M. Rendon, GMX-7; Manuel M. Rendon, GMX-3; Gerald B. Rogers, SD-2; Rosinaldo Romero, GMX-3; Viola G. Salazar, D-2; Domenic Scarafiotti, CMB-6; Manuel J. Schafer, GMX-7; Robert L. Shehan, CMB-DO; Thomas L. Shipman, H-DO.

James E. Stallings, GMX-3; Ernestine V. Stewart, GMX-7; Emory J. Stovall, Jr., P-14; Stephen G. Sydoriak, CMF-9; Caroline Tafoya, GMX-7; Pasqualita Tafoya, SP-8; Joseph W. Taylor, CMB-6; Paulus P. Thomas, SD-3; Beatrice H. Thompson, D-8; Robert P. Todd, SP-3; Adela P. Tometich, SP-3; Victor Trujillo, SP-4; James T. Waber, CMF-5; John P. Wahlen, ENG-1; Edward F. Will, SP-3; and Alfred H. Zeltmann, CMF-2.

### Ten Years Service

Frank G. Alarid, D-2; Ralph E. Anderson, T-1; Rudy J. Archuleta, W-1; Vencil M. Armijo, J-11; Bert H. Baca, CMB-1; Harry E. Ballance, GMX-3; Barbara L. Bayhurst, J-11; Ruth E. Beckett, DIR



OFF; Clarence M. Berg, SP-1; Ivan Bergstein, AO-2; Robert L. Bivins, T-7; William E. Braun, SD-5; John C. Bronson, CMF-9; James A. Brophy, SD-5; M. Lucille Brush, SP-DO.

John J. Busick, GMX-11; Charles C. Campbell, SP-3; Thomasita N. Cata, GMX-3; Peter J. Cattani, J-1; Donald E. Chamberlin, SD-O; Dale W. Coburn, ENG-4; George E. Cole, SD-2; Oliver A. Cole, GMX-3; Robert L. Cole, SD-5; James S. Coleman, CMF-4; Thomas J. Cooper, SD-2; Joe Wanda Cramer, W-1; Blaine H. Cushing, SD-5; Avis R. Dade, SP-1; Fortunato A. Damiano, CMB-7.

Keith V. Davidson, CMB-6; James M. Dickinson, CMF-13; Esther P. Donathan, P-1; Lester A. Doremire, CMB-7; Carl A. Enloe, ENG-4; James H. Fancher, ENG-4; Burton E. Farley, SD-5; Florence M. Farley, MR; Robert B. Ferrell, W-1; Jim B. Finley, GMX-1; Mary Ann Ford, D-DO; Eldon H. Freidline, GMX-3; Charles W. Fuller, J-7; Buddy A. Gallegos, SP-2.

Fidel M. Garcia, D-6; Robert W. Gardell, ENG-1; Manfred J. Gerardot, GMX-3; Jim M. Giron, ENG-4; Thomas E. Gould, GMX-4; M. Virginia Griffith, H-DO; Aloys C. Guenther, SP-2; Jose W. Gutierrez, GMX-11; Wilma V. Haney, D-2; Francis H. Harlow, Jr., T-3; Albert M. Harris, GMX-3; Troy B. Harris, GMX-3; Frances M. Harrison, P-6.

Walter D. Hatch, K-3; Mary Irene Hatfield, SP-LA; Lloyd A. Hewitt, SD-1; John E. Hockett, CMF-13; Herman W. Hoerlin, J-10; John R. Hopkins, N-3; Marianna V. Howenstine, PER-1; Harry C. Hoyt, T-5; Nelson Jarmie, P-DO-R; Clyde Jirikowic, CMB-7; Raymond J. Johnson, SD-1; Thomas L. Jordan, T-1; Harvey J. Kellogg, SD-5.

Robert N. Kennedy, K-3; Jack L. Kerns, SD-1; Amil H. Koetter, CMB-7; Verna Maye Konrad, AO-4; William J. Lambert, SD-1; Robert M. Lang, N-4; David A. Liberman, T-4; Jose N. Lujan, GMX-3; Susie C. Lujan, MR; Russell L. Lynch,

SD-5; Stanley P. Marsh, GMX-6; Juan A. Martinez, SD-1.

Lugarda C. Martinez, GMX-7; Rubel F. Martinez, K-1; Robert S. Mascarenas, MR; Flora E. McCracken, BUS OFF; John L. McHale, Jr., T-11; Robert C. Meier, PER-2; Barbara J. Melton, T-1; Arthur W. Miller, NTS J-3; Opal D. Milligan, P-10; Carroll B. Mills, T-DO-T; Arthur Montoya, PER-4; Richard H. Moore, CMB-7.

Roger H. Moore, T-1; Harlan H. Morris, SD-5; Mary S. Morris, D-2; Eldon L. Murley, NTS J-5; Darrel V. Nelson, SD-5; Josephine M. O'Keefe, J-16; Joseph A. Ortiz, SP-3; Robert E. Overlin, ENG-4; Alfred T. Peaslee, Jr., T-2; Albert G. Petschek, T-12; George L. Ragan, K-1; William A. Ranken, N-5.

Robert J. Reithel, GMX-7; Elgin H. Rex, H-7; Marvin H. Rich, T-3; Bruce B. Riebe, H-1; Gretchen R. Riese, D-2; James C. Robinson, SD-1; Jose B. Rodriguez, CMB-6; Ruben G. Rolie, SD-5; Daniel Romero, SD-1; Robert E. Roush, W-1; Jerome T. Rowen, CMB-6; M. Ninfa Roybal, H-7; Tony Roybal, ENG-2.

Johnnie R. Salazar, W-3; B. Roy Saunders, Jr., J-15; William H. Schweitzer, H-8; Anthony A. Serna, SP-3; Eulogio J. Serrano, SD-3; Ella H. Sizer, T-1; E. Luween Smith, SD-2; John F. Spalding, H-4; William A. Spencer, GMX-3; Harold W. Staake, SD-2; Eleanor B. Standing, D-2; Edgar B. Stein, W-1.

Barbara Stempel, SP-LA; Sue Thompson, P-1; Robert N. Thorn, T-2; K. LaMoine Todd, AO-5; Noberta Vigil, SP-8; Joseph J. Vucenic, SD-5; John F. Weinbrecht, N-3; Franklin P. Welch, AO-4; Mark B. Wells, T-7; Grace W. Whitis, P-1; Alta R. Whittemore, P-1; Lloyd C. Wilkerson, K-4; George L. Williams, GMX-6; Ralph E. Williamson, T-2; Thomas E. Wimett, N-2; Donald L. Winchell, W-3, and William H. Yeaman, SD-5.



The latest group of Laboratory employees to be awarded University of California 20-year service pins.

After 3½ years of building and testing, the world's largest tandem Van de Graaff accelerator has found a home at Los Alamos.

The new accelerator, or "atom smasher," will be in operation within four to six months, at which time the Los Alamos Scientific Laboratory will become the best equipped low energy particle physics laboratory in the world, according to Richard L. Henkel, LASL physicist who has followed the project closing since its inception.

The tandem unit is being installed in conjunction with the existing vertical Van de Graaff in such a manner that the two devices can be used as individual machines on separate experiments, or the vertical machine can serve as an injector for the new Van de Graaff to provide singly charged particles, such as protons, deuterons, and tritons, with energies up to and exceeding 27 million electron volts (Mev).

The new accelerator is dubbed

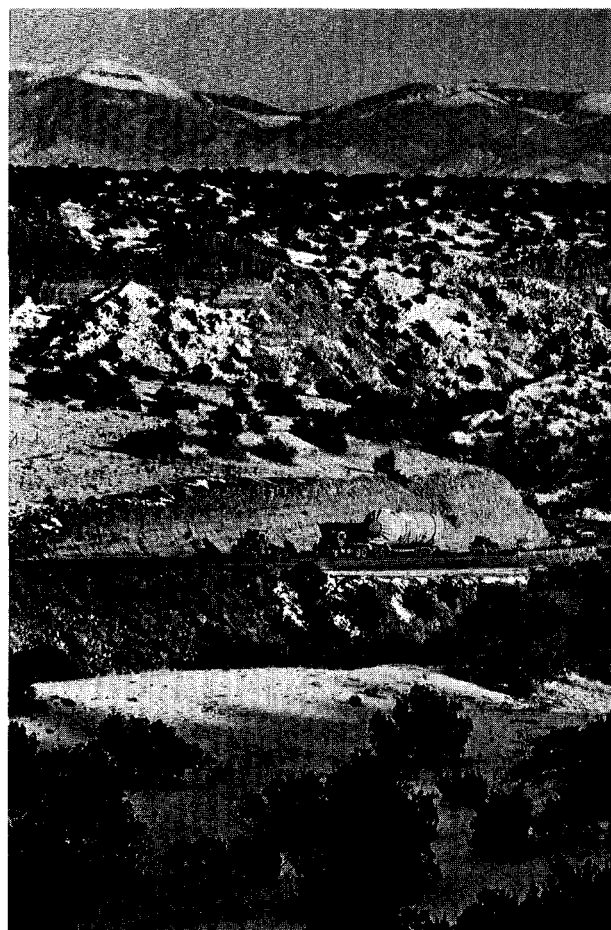
"tandem" because it gives particles a double boost. The tandem machine in conjunction with the vertical Van de Graaff gives LASL one of two three-stage accelerators in the world. The other three-stage unit, considerably smaller than LASL's, is located at the University of Texas in Austin.

High Voltage Engineering Co. of Burlington, Mass., constructed LASL's new tandem device, which exceeds design expectations. During its year shakedown at the factory, it

## NEW "TANDEM VAN"

An AT&SF switch engine at Belen spots flatcar with tandem Van de Graaff tank on priority siding where it was picked up by freight for the final leg of a railway journey from Burlington, Massachusetts, to Albuquerque.

Two trucks, which took over the load in Albuquerque, haul the 60-ton accelerator tank up the grade to Los Alamos.



consistently accelerated sub-atomic particles to the design energies of 15 Mev, and went as high as 19 Mev. The older vertical machine works in the range of 8 to 9 Mev.

A Van de Graaff accelerator must be built with great precision, and the tank, accelerating tube and associated equipment must be aligned so closely that surveyors' instruments are used during assembly. Transportation of the 60-ton tandem tank from the East Coast to Los Alamos posed somewhat of a

problem; any twisting or distortion of the tank, which is 43 feet long and 12 feet in diameter, might adversely affect the output of the machine.

The tank, made of 1¼-inch-thick steel, was loaded aboard a flat car at Burlington, and the first part of the trip was handled by the Boston & Maine railway and the New York Central. The Santa Fe railroad took over the flat car and its oversized load at Streator, Illinois, and de-

livered the cargo to the Springer Transfer Company siding in Albuquerque, where a giant crane "off-loaded" the tank onto a low-boy trailer. Two trucks pulled the trailer to LASL where Zia Company riggers jockeyed the tank into its new building.

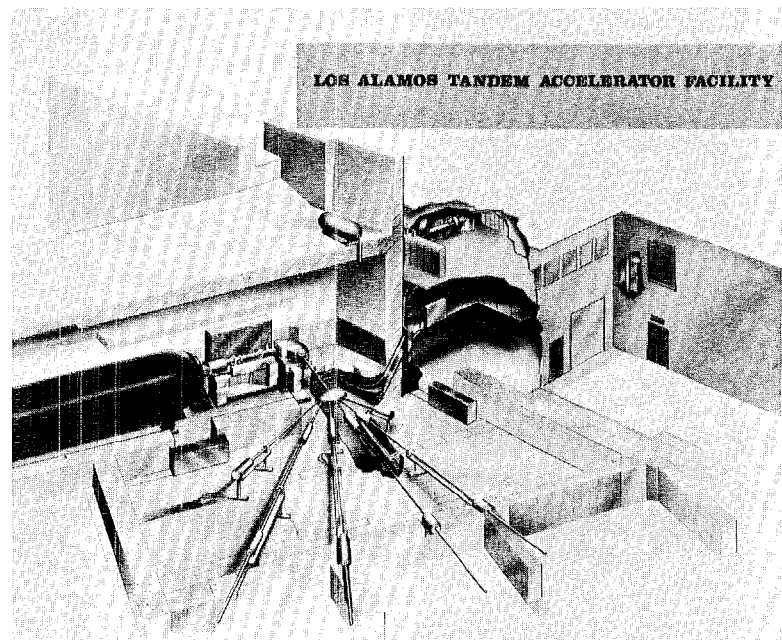
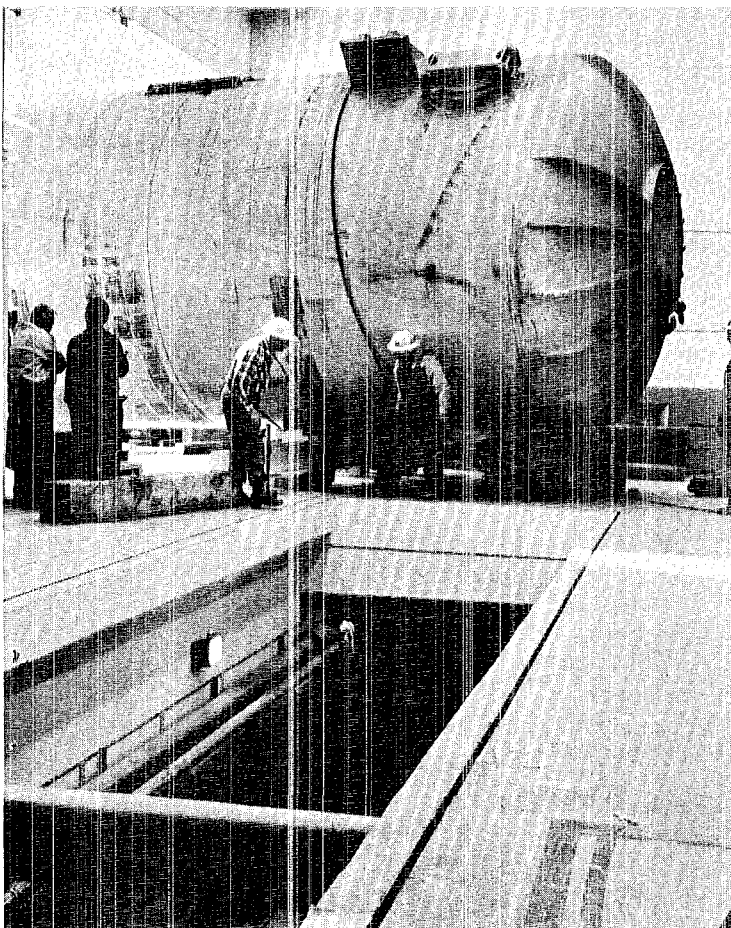
Henkel said the new Van de Graaff will be used for pure physics research. Its sub-atomic particles will be able to probe nuclei of heavy elements with great precision.

# WORLD'S LARGEST

BY PETER MYGATT

Zia Company steel riggers jockey the 43-foot-long tank around a tight corner to install it over the pit in the foreground.

Photographs by Bill Jack Rodgers



This cutaway drawing by LASL illustrator Hal Olsen shows how the tandem Van de Graaff accelerator will look when ready for use. The sub-atomic particles from the accelerator are turned by a bending magnet, and then travel through the particle beam tubes (lower center). Various experiments may be located along the tubes as required.

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## NEW HIRES

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Following are LASL new hires:

Hans Rudolph Scheuter, St. Paul, Minnesota, W-1.

William Thomas Bouchard, Denver, Colorado, GMX-3.

Jean J. H. Berlijn, Baltimore, Maryland, W-4.

Robert E. Stapleton, Colorado Springs, GMX-11 (Rehire).

Marion Louise LaCasse, Los Alamos, SP-1.

Mary L. Curfman, Los Alamos, GMX-DO (Casual).

Alethea E. Klein, Santa Fe, N.M., T-1 (Casual-Rehire).

Richard D. Schnupp, Albuquerque, N.M., SD-2.

Dorothy L. Taylor, Los Angeles, Calif., SP-LA.

Mark Lee Elder, Norman, Oklahoma, N-DO.

Ray Osmun Reade, Ft. Worth, Texas, N-3.

Donald F. Sterner, Tucson, Arizona, ENG-1.

Jean Kelch Frame, Los Alamos, N-2 (Rehire).

Patrick Eloy Paiz, Santa Fe, N.M., SD-1.

Kitty LaMoine Todd, Los Alamos, AO-5 (Rehire).

Henry N. Fisher, Las Cruces, N.M., T-2.

Harry E. Williams, III, Espanola, N.M., SP-3.

Susan Lee Embry, Los Alamos, P-DO (Casual).

David L. Hooks, Sr., Los Alamos, GMX-3.

Darrel Max Spring, Santa Fe, N.M., D-8 (Rehire).

Ricki B. Johnson, White Rock, J-11 (Rehire).

## *The Technical Side*

**Presented at a Seminar, Iowa State University, Ames, January 20:**

"Studies of Rotation-Particle Coupling in Odd-A Deformed Nuclei" by Merle Bunker, P-2.

**Seminars, MIT, January 27; Case Institute, January 28 and University of Colorado, February 5:**

"Proton-Proton Scattering at the Interference Minimum and the Shape Parameter" by John E. Brolley, P-DOR.

**Annual Sherwood Vacuum Conference, Washington, D. C., January 30-31:**

"Plasma Research Including Radiation Induced Wall Effects in Scylla" by James A. Phillips, P-14.

**American Institute of Chemical Engineers High Pressure Symposium on Techniques at High Pressures, Memphis, Tennessee, February 2-5:**

"Use of Moderately High Pressures at Cryogenic Temperatures" by Frederick J. Edeskuty and Robert L. Mills, both of CMF-9.

**Seminar, Nuclear Engineering Department, Texas A. & M., February 11-12:**

"The LASL Research Reactors and Their Experimental Facilities" by William E. Stein, P-2.

**Industry-AEC Meeting on Reprocessing of NERVA Scrap, Oak Ridge, Tennessee, February 13:**

"Recovery of Cold Rover Fuel Scrap at LASL" and "Recovery and Purification of Incinerated Graphite Residues at LASL" by John A. Kircher, CMB-8.

**Seminar, University of Wyoming, Laramie, February 14:**

"Physics Research at Los Alamos and the Proposed Meson Facility" by Richard F. Taschek, P-DO.

**Lecture, University of Washington, February 26-28; Oregon State University, March 2; University of Oregon, March 3:**

"Some Applications of Experimental

Physics Techniques to Reactor Materials Problems" by Dale M. Holm, K-1.

**ASM Golden Gate Metals Conference, San Francisco, Calif., February 13-14:**

"Some Observations Attributed to the Effects of Impurities in Tantalum" by Louis D. Kirkbride, Donald N. Dunning, William E. Ferguson, and Ralph H. Perkins, all of K-2.

**Conference of New Mexico Mathematics Teachers, Roswell, New Mexico, February 15:**

"The College Share in Updating the Nation's Mathematics" by R. Keith Zeigler, T-1.

**Seminar on Compounds Containing Group V and VI Anions, Argonne National Laboratory, February 26-27:**

"Decomposition Pressures and Melting Points of Some Actinide Mononitrides" by William M. Olson, CMF-5.

**American Physical Society Meeting, Tucson, Arizona, February 27-29:**

"The Viscosity of Cesium Vapor" by R. M. Henson (Texas A. & M.), and Thomas F. Stratton and Jay Todd, Jr., both of N-5.

"Deuteron Magnetic Resonance in Heavy Ice (D<sub>2</sub>O)" by Jasper A. Jackson and Sherman W. Rabideau, both of CMF-2.

**Keynote address, Science and Engineering Week, Sacramento State College, Sacramento, California, February 18:**

"Safety in Some Endeavors Using Atomic Energy" by Gerold H. Tenney, GMX-1.

**Third Annual Symposium on High Temperature Conversion Heat to Electricity, Tucson, Arizona, February 19-21:**

"Experimental Electrical Characteristics of a Cesium Plasma Diode Using a UC Emitter" by Walter H. Reichelt, N-5.

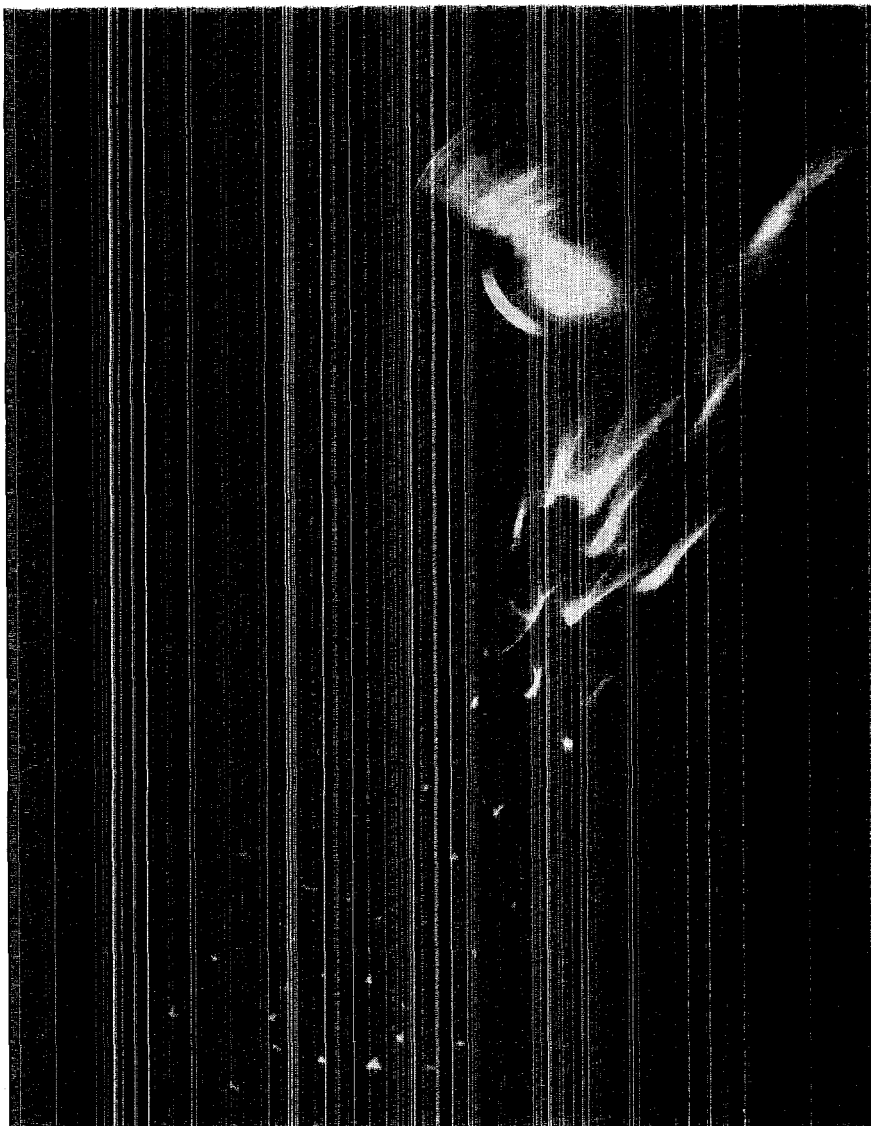
"The Development of Fission Heated Thermionic Converters" by William A. Ranken, N-5.



Laboratory engineer Bill Spencer, a professional hand balancer during his college years, keeps a cool head while doing a head stand atop a snow man. Spencer, who teaches a YMCA gymnastics course for high school students, says

this is the most reliable bottom man he's ever found. This photograph was submitted by Sona Rodgers. If you have an unusual photograph, how about sending it to THE ATOM? It could end up on this page.





*Photographic interpretation by William Thonson*

Post-doctoral appointments at Los Alamos are available for the first time to young scientists and engineers. Elementary particle research, plasma physics, space physics, molecular and cellular biology, and cryogenics are among the areas of opportunity. This new program extends the Laboratory's tradition of fundamental research.

*Qualified applicants are invited to send resumes to:*  
*Director of Personnel,*  
*Division 64-23*



All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. U. S. citizenship required.